Space Weather Forecast

Issued on Thursday, 01 February 2024 at 13:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of isolated R1/R2 Radio Blackouts. A fast wind from a coronal hole possibly arriving by day 4 (Feb 04).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is Low, with a long-duration Common-class flare, peaking at 01/0743 UTC. This produced a CME (Coronal Mass Ejection) which is yet to be analysed for any potential Earth-directed component. There are currently ten sunspot regions on the visible disc, two of which are noteworthy and two of which are yet to be numbered. A large spot in the northeast remains the most magnetically complex region on the disc. A smaller yet almost equally complex spot resides in the northeast also, this has grown recently and comprises a north-south magnetic alignment in its leading portion. Other spots on the disc have generally shown some slow development, but remain fairly simple and stable at this time. One new spot has become evident close to the east limb. A glancing blow from a CME which left the Sun on the 29 Jan arrived at Earth at 01/0520 UTC, although very little impact has been observed, with geomagnetic activity remaining Quiet. A single CME was also observed leaving the western limb shortly after midday on 31 Jan. Although the source of which is still not certain, after computation, it appears to be missing behind Earth. No other Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were indicative of a weak and waning coronal hole fast wind, from slightly elevated to slow-ambient levels, before rising again to slightly elevated levels following the arrival of a weak CME (which left the Sun on 29 Jan). Wind speeds ranged from 390 to 460km/s throughout the period, currently declining to background levels as the weak CME passes. The interplanetary magnetic field (IMF) was mostly weak, but briefly rose to moderate following the weak CME arrival, with the all-important north-south component, also varying weakly. The net result of the above solar wind measures was Quiet geomagnetic activity (Kp 0-2), despite the glancing blow from a CME early on day 1 (01 Feb).

Energetic Particles / Solar Radiation: High energy proton flux is at slightly elevated levels, but remains below the S1/Minor Storm threshold. There is a nominal risk of exceeding the S1 threshold during the period.

Four-Day Space Weather Forecast Summary

Solar Activity: Low, but with a chance of increasing to Moderate with isolated Moderate-class flares, most likely from the two largest regions in the northeast disc.

Solar Wind / Geomagnetic Activity: Solar winds are gradually declining to background levels following a weak and glancing blow from the CME (which left the Sun on 29 Jan) and the waning effects of previous coronal hole fast wind. A further CME from the 31 Jan may give a glancing blow at Earth either on day 3 or 4 (03-04 Feb), although this is low confidence. The next anticipated fast wind from a coronal hole in the southern hemisphere is expected on day 4 (04

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Feb), with solar wind speeds reaching 450-500 km/s. Despite the arrival of a weak CME early on day 1 (01 Feb) geomagnetic activity has been Quiet, and is expected to remain Quiet during days 1-3 (01-03 Feb). There is a chance for isolated Active intervals on day 4 (04 Feb), due to the influence of CH96/+, also pending the analysis of the CME early on day 1 (01 Feb).

Energetic Particles / Solar Radiation: High energy proton flux is expected to remain below the S1/Minor Radiation Storm level, with a nominal risk of exceeding the S1 threshold during the period.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	5	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	45	45	45	45
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

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Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	5	5
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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